

FORM PTO-1390 (Modified)
(REV 11-98)

U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

ATTORNEY'S DOCKET NUMBER

TRANSMITTAL LETTER TO THE UNITED STATES

PF 93 PCT US

DESIGNATED/ELECTED OFFICE (DO/EO/US)

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR

CONCERNING A FILING UNDER 35 U.S.C. 371

09/913350

INTERNATIONAL APPLICATION NO.

PCT/FR00/00384

INTERNATIONAL FILING DATE

February 16, 2000

PRIORITY DATE CLAIMED

February 18, 1999

TITLE OF INVENTION

Toothbrush that spontaneously adopts a position of stable equilibrium on a horizontal support

APPLICANT(S) FOR DO/EO/US

Arnaud Doat

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☐ This is an express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ☐ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371 (c) (2))
 - a. ☒ is transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ has been transmitted by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☒ A copy of the International Search Report (PCT/ISA/210).
8. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))
 - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ have been transmitted by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☒ have not been made and will not be made.
9. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
10. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).
11. ☒ A copy of the International Preliminary Examination Report (PCT/IPEA/409).
12. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).

Items 13 to 20 below concern document(s) or information included:

13. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
14. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
15. ☒ A **FIRST** preliminary amendment.
16. ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
17. ☐ A substitute specification.
18. ☐ A change of power of attorney and/or address letter.
19. ☒ Certificate of Mailing by Express Mail
20. ☐ Other items or information:

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|---|--|---|--|--|--|
| U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR 1.53) <div style="font-size: 2em; font-weight: bold;">09/913350</div> | | INTERNATIONAL APPLICATION NO. PCT/FR00/00384 | | ATTORNEY'S DOCKET NUMBER PF 93 PCT US | |
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21. The following fees are submitted:

BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)) :

| | |
|--|------------|
| <input type="checkbox"/> Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO | \$1,000.00 |
| <input checked="" type="checkbox"/> International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO | \$860.00 |
| <input type="checkbox"/> International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO | \$710.00 |
| <input type="checkbox"/> International preliminary examination fee paid to USPTO (37 CFR 1.482) but all claims did not satisfy provisions of PCT Article 33(1)-(4) | \$690.00 |
| <input type="checkbox"/> International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(1)-(4) | \$100.00 |

ENTER APPROPRIATE BASIC FEE AMOUNT =

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| | \$860.00 |
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Surcharge of **\$130.00** for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492 (e)).

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| | \$0.00 |
|--|---------------|

| CLAIMS | NUMBER FILED | NUMBER EXTRA | RATE | | |
|--------------------|--------------|--------------|-----------|--|---------------|
| Total claims | 18 - 20 = | 0 | x \$18.00 | | \$0.00 |
| Independent claims | 1 - 3 = | 0 | x \$80.00 | | \$0.00 |

Multiple Dependent Claims (check if applicable). ☐

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| | \$0.00 |
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TOTAL OF ABOVE CALCULATIONS =

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| | \$860.00 |
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Reduction of 1/2 for filing by small entity, if applicable. Verified Small Entity Statement must also be filed (Note 37 CFR 1.9, 1.27, 1.28) (check if applicable). ☐

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|--|---------------|
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SUBTOTAL =

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| | \$860.00 |
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Processing fee of **\$130.00** for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492 (f)).

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TOTAL NATIONAL FEE =

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|--|-----------------|
| | \$860.00 |
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Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) (check if applicable). ☐

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|--|---------------|
| | \$0.00 |
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TOTAL FEES ENCLOSED =

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|--|-----------------|
| | \$860.00 |
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| | |
|--|---------------------------|
| | Amount to be: refunded \$ |
| | charged \$ |

☒ A check in the amount of **\$860.00** to cover the above fees is enclosed.


☐ Please charge my Deposit Account No. _____ in the amount of _____ to cover the above fees.
A duplicate copy of this sheet is enclosed.

☒ The Commissioner is hereby authorized to charge any fees which may be required, or credit any overpayment to Deposit Account No. **8-3220** A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

G. PATRICK SAGE
THE FIRM OF HUESCHEN AND SAGE
 500 Columbia Plaza
 350 East Michigan Ave.
 Kalamazoo MI, 59007



25666

PATENT TRADEMARK OFFICE

G. Patrick Sage

SIGNATURE

G. PATRICK SAGE

NAME

37 710

REGISTRATION NUMBER

August 13, 2001

DATE

PF 93 PCT US/lw

* * * * *

Applicants : Arnaud DOAT
Title : Toothbrush that spontaneously adopts a position of stable
equilibrium on a horizontal suport

* * * * *

Honorable Commissioner of Patents and Trademarks
Washington, D.C. 20231

PRELIMINARY AMENDMENT

Sir:

As soon as the Serial No. and Filing Date have been accorded the above-identified application, kindly enter the following amendment:

IN THE CLAIMS: Kindly cancel claims 1-19 and replace with the following claims 20-38, which correspond to each cancelled claim.

REMARKS:

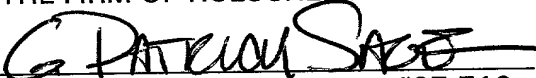
A few constructive editorial changes have been made in the claims to bring them somewhat more into line with U.S. practice and requirements.

Applicants have cancelled all of the originally filed claims, 1-19. New claims 20-38 have been added to better encompass the full scope and breadth of the invention, notwithstanding Applicants' belief that the claims would have been allowable as originally filed. Accordingly, Applicants assert that no claims have been narrowed within the meaning of Festo. The replacement Claims are attached hereto.

Entry of the amendments and favorable action on the merits are all hereby respectfully solicited.

Respectfully submitted,

THE FIRM OF HUESCHEN AND SAGE


G. PATRICK SAGE, Attorney #37,710

Dated: August 13, 2001
Customer No. 25,666
500 Columbia Plaza
350 East Michigan Ave.
Kalamazoo, MI 49007
(616) 382-0030

Enclosure: Return Postal Card Receipt
Replacement Claims 20-38

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CLAIMS

- 5 20. A toothbrush of elongate form, comprising bristles, and so designed as to exhibit, on a flat horizontal support, at least one position of stable equilibrium in which the longitudinal direction of the brush is essentially parallel to the support and the bristles lie at a distance from the support and extend toward the support, wherein the position(s) of stable equilibrium is/are the only position(s) of stable equilibrium of the brush on the support.
- 10 21. The brush as claimed in claim 20, wherein there is only one position of stable equilibrium of the brush.
- 15 22. The brush as claimed in claim 20, wherein the brush comprises:
- a distal portion;
- a proximal portion extending between the bristles and the distal portion in the longitudinal direction; and
- an intermediate portion between the distal and proximal portions,
the brush being so designed that, for any position in which the brush is supported by a flat horizontal support with the longitudinal direction essentially parallel to the support, the distal and proximal portions constitute the portions of contact of the brush with the flat support and the intermediate portion lying at a distance from the support.
- 20 23. The brush as claimed in claim 22, wherein the brush is so designed that the proximal portion exhibits a single point of contact with the support in each position of stable equilibrium.
- 25 24. The brush as claimed in claim 22, wherein the brush is so designed that, for any position in which the brush is supported by a flat horizontal support with the longitudinal direction essentially parallel to the support, the proximal portion exhibits a single point of contact with the support.
- 30 25. The brush as claimed in claim 22, wherein the proximal portion is of a generally flat shape.
- 35 26. The brush as claimed in claim 22, wherein the proximal portion is of a generally flat shape in a plane essentially perpendicular to the longitudinal direction of the brush.
- 40 27. The brush as claimed in claim 22, wherein the proximal portion is of a generally flat shape in a plane that is essentially inclined with respect to the longitudinal direction of the brush.
- 45 28. The brush as claimed in claim 22, wherein the proximal portion is off-center with respect to a central longitudinal axis of the brush.
29. The brush as claimed in claim 22, wherein the proximal portion projects from a side of the handle opposite another side of the handle supporting the bristles .

30. The brush as claimed in claim 29, wherein the proximal portion projects from the handle all the way around a longitudinal axis of the brush.
- 5 31. The brush as claimed in claim 29, wherein the proximal portion forms with the handle a re-entrant edge on a side of the proximal portion situated toward the bristles.
- 10 32. The brush as claimed in claim 29, wherein the proximal portion forms with the handle a re-entrant edge on a side of the proximal portion situated toward the distal portion.
33. The brush as claimed in claim 22, wherein the proximal portion has an elastomeric outer face.
- 15 34. The brush as claimed in claim 22, wherein the brush is so designed that the distal portion exhibits two points of contact with the support in each position of stable equilibrium.
- 20 35. The brush as claimed in claim 22, wherein the distal portion has a flat part generally parallel to the longitudinal direction of the brush.
36. The brush as claimed in claim 20, wherein the brush has the shape illustrated in one of figures 1-5.
- 25 37. A toothbrush of elongate form and comprising bristles, wherein it is so designed that, when the brush is placed in any initial position on a flat horizontal support, the brush spontaneously adopts a stable position in which the longitudinal direction of the brush is essentially parallel to the support and the bristles lie at a distance from the support and extend toward the support.
- 30 38. The brush as claimed in claim 37, wherein the brush is so designed that the stable position is always the same, whatever the initial position may be.
- 35

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TOOTHBRUSH THAT SPONTANEOUSLY ADOPTS A POSITION OF
STABLE EQUILIBRIUM ON A HORIZONTAL SUPPORT

The invention relates to toothbrushes.

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A toothbrush with a handle of elongate form and a head containing bristles is known. The shape of the handle of the brush is profiled to a triangular cross section. When placed on a flat horizontal support, it therefore
10 has three positions of stable equilibrium. In two of these positions, the bristles point up away from the support. In the third position the bristles extend toward the flat support while being at a distance from it. The toothbrush can be left in this position after
15 use. It can therefore drain and dry without the bristles being in contact with the support. Furthermore, as this position corresponds to a stable equilibrium, the user has only to deposit the brush in a position near the stable position for the brush
20 spontaneously to revert to this stable position. The handling of the brush therefore requires no particular care by the user. Nonetheless, in the other two positions, the bristles are oriented upward and are therefore likely to come into contact with other
25 objects which the user may be handling. This is detrimental to good brush hygiene.

It is an object of the invention to provide a brush that is simpler to handle and further reduces the risk
30 of contact between the bristles and an external item.

In order to achieve this object, the invention provides a toothbrush of elongate form, comprising bristles, and so designed as to exhibit, on a flat horizontal
35 support, at least one position of stable equilibrium in which the longitudinal direction of the brush is essentially parallel to the support and the bristles lie at a distance from the support and extend toward

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the support, in which brush said position(s) of stable equilibrium is or are the only position(s) of stable equilibrium of the brush on the support.

5 Thus, in whatever position the user deposits the brush on the support, the brush will adopt the position in which the bristles point toward the support and are at a distance from it and therefore have little exposure to contact with another item. Given that the user can
10 deposit the brush in any position on the support to achieve this result, the care required to handle this toothbrush is much reduced even though the brush ensures good bristle hygiene.

15 The expression "position of stable equilibrium" here means a position to which the brush reverts spontaneously under the action of gravity once the brush has been deposited in any position near to the stable position, sometimes after a few oscillations
20 about the stable position. (Of course, if there is only one stable position, this function will apply whatever the initial position.) From a physical point of view, in the or each position of stable equilibrium, the potential energy of the brush associated with the
25 gravity of the Earth is at an absolute or local minimum compared with the other, unstable positions. Hence the expression "potential trough".

The or each stable position depends on the volume of
30 the brush and on the distribution of its mass.

Advantageously, there is only one said position of stable equilibrium of the brush.

35 Thus, this position may be that in which the bristles are as close as possible to the support, without being in contact with it, and are at the least risk of being contacted by another object.

Advantageously, the brush comprises:

- a distal portion;
- a proximal portion extending between the bristles and the distal portion in the longitudinal direction; and
- an intermediate portion between the distal and proximal portions,

the brush being so designed that, for any position in which the brush is supported by a flat horizontal support with the longitudinal direction essentially parallel to the support, the distal and proximal portions constitute the portions of contact of the brush with the flat support and the intermediate portion lies at a distance from the support.

Thus, the proximal portion ensures that the brush rolls on the support from any initial position to the or each stable position.

Advantageously, the brush is so designed that the proximal portion exhibits a single point of contact with the support in the or each position of stable equilibrium.

Advantageously, the brush is so designed that, for any position in which the brush is supported by a flat horizontal support with the longitudinal direction essentially parallel to the support, the proximal portion exhibits a single point of contact with the support.

Advantageously, the proximal portion is of a generally flat shape.

Thus the proximal portion can act as a contact surface for one or more fingers of the hand of the user manipulating the brush as a means of holding the brush more securely in the hand, or turning it more easily in the hand during brushing. This contact surface can be

used in particular by the thumb or index finger of this hand. Moreover, the proximal portion forms an obstacle that will tend to limit or even prevent fluid running from the bristles down the handle to the user's hand.

5 The handle thus remains clean and dry during brushing.

Advantageously, the proximal portion is of a generally flat shape in a plane essentially perpendicular to the longitudinal direction of the brush.

10

Advantageously, the proximal portion is of a generally flat shape in a plane that is essentially inclined with respect to the longitudinal direction of the brush.

15 Advantageously, the proximal portion is off-center with respect to a central longitudinal axis of the brush.

Thus, the proximal portion makes a significant, even determining, contribution to rocking the brush into the or each stable position.

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Advantageously, the brush comprising a handle, the proximal portion projects from a side of the handle opposite another side of the handle supporting the bristles.

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Advantageously, the proximal portion projects from the handle all the way around a longitudinal axis of the brush.

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Advantageously, the proximal portion forms with the handle a re-entrant edge on a side of the proximal portion situated toward the bristles.

35 Thus, the proximal portion forms a highly effective obstacle to fluid running from the bristles toward the handle.

Advantageously, the proximal portion forms with the handle a re-entrant edge on a side of the proximal portion situated toward the distal portion.

- 5 Thus, the proximal portion forms a good abutment to the fingers of the hand holding the brush.

Advantageously, the proximal portion has an elastomeric outer face.

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Thus, the rocking of the brush into the or a stable position occurs silently, even if the flat support is made of a hard material. This ensures that there is no disagreeable noise, even if the brush oscillates for a
15 few moments about the stable position.

Advantageously, the brush is so designed that the distal portion exhibits two points of contact with the support in the or each position of stable equilibrium.

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Advantageously, the distal portion has a flat generally parallel to the longitudinal direction of the brush.

- Advantageously, the brush has the shape illustrated in
25 one of figures 1-5.

- The invention also provides a toothbrush of elongate form and comprising bristles, so designed that, when the brush is placed in any initial position on a flat
30 horizontal support, the brush spontaneously adopts a stable position in which the longitudinal direction of the brush is essentially parallel to the support and the bristles lie at a distance from the support and extend toward the support.

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Advantageously, the brush is so designed that the stable position is always the same, whatever said initial position may be.

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Other features and advantages of the invention will become clearer in the course of the following description of four preferred embodiments given by way of nonlimiting examples. In the accompanying drawings:

- 5
- figure 1 is a perspective view of a toothbrush in a first embodiment of the invention, resting on a support;
- 10
- figure 2 is a view of the underside of the brush shown in figure 1; and
 - figures 3-5 are views similar to figure 1 showing three other respective embodiments.

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Figures 1 and 2 illustrate a first embodiment of the invention. The toothbrush 2 comprises a handle 4 which is elongate in a rectilinear general direction. The handle has a terminal end 6 provided with bristles 9

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for brushing, thus forming the head of the brush. The head 6 has one face 8 from which the bristles 9 extend, the face being flat in the vicinity of the bristles, and the bristles extending at right angles from the face 8. The head has another face 10, on the opposite

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side from the face 8, whose shape is profiled along the longitudinal direction of the brush, the profile having a generally semicircular form and thus generating two edges 12 at the intersection with the face 8. For convenience and with reference to figure 1, faces 8 and

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10 will be referred to as the upper and lower faces, respectively.

Moving toward the other terminal end 20 of the brush, the lower face 8 moves away from the curved upper face

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10 so that the thickness of the brush (measured parallel to the bristles 9) increases. For this purpose, the lower face 8 is continued by a section whose profile is curved parallel to the longitudinal direction of the brush. The lower face 8 eventually

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above the upper faces 10 and 22 than below the lower face 8 and lower flat 18. This distance is at its least below the lower face 8, is greater on the sides of the brush and at its greatest above the upper faces 10 and 22. Because the ring is tilted, it follows that the ring projects for a short distance on the bristle side, toward the bristles, whereas it projects for a long distance on the upper or non-bristle side, away from the bristles. With the handle, the ring 16 forms two re-entrant edges of circular general form 24, 26, toward the front and rear, respectively, of the brush.

The handle and the ring may be made, for example, from a hard, lightweight plastic material, the ring also being for example covered with a softer elastomer designed to form the outer face of the ring 16.

The width of the brush at right angles to its thickness decreases from the ring 16 to each of its terminal ends, to give it a tapering form as illustrated in figure 2.

The mass distribution of the brush and its volume are selected to ensure that, on any flat horizontal support 30, the brush has a position of stable equilibrium in which the brush rests on the support via a point 32 situated at the rear end 20 on the flat 18, and via a point 34 situated on the perimeter of the ring 16, on the same side as the bristles 9. In this position, the bristles 9 extend toward the support 9, at right angles to the plane of the support and at a distance from it, the free lower extremities of the bristles being off the support.

In addition, the mass distribution and the volume are such that this position constitutes the only position of stable equilibrium of the brush on a flat horizontal support. This means that, when the user places the brush on the support in any position in which the brush

is laid more or less parallel to the support, the brush rolls spontaneously under the action of gravity in order to position itself in the abovementioned stable position. The rolling occurs partly at the end 20, on the upper face 22 and the flat 18. It also occurs around the perimeter of the ring 16 which, due to the convex circular form of this perimeter, always has only one point of contact with the support. By extension, the user can even place the brush in any position on the support, for example, standing it on the rear end 20, and the brush will always fall down horizontal, before rolling into its stable position. (The only risk is then that as it falls, the bristles may contact the support.) Here the stable position will be reached after a few oscillations of the brush about its stable position until it becomes motionless because, in the stable position, the brush rests on the support via two points only. The eccentric ring 16 here plays a significant part in this function of the brush, as do the volume and the mass distribution of the brush as a whole.

The rolling of the brush from any position into the stable position takes place without any contact between the bristles and the support, and thus improving the hygiene of the brush. The elastomer covering the ring ensures that the brush rolls quietly, even if the support is made of a hard material.

During brushing, the user can hold the brush in the hand by means of the handle section extending between the stop 16 and the rear end 20. The ring 16 can thus be used as a stop for at least one of the fingers of the hand, for example the thumb and/or the index finger, so as to enable the brush to be held firmly or facilitate its rotation in the hand during brushing. Additionally, the stop 16 limits or even prevents liquid from running down from the bristles to the rear

end 20 and to the user's hand. The handle thus remains clean and dry.

During the rolling of the brush on the support, the
5 part 17 of the section 14 of the handle contiguous with the ring 16 on the opposite side from the bristles never comes into contact with the support.

That part of the section 14 of the handle which is next
10 to the bristle-facing side of the ring may have a smaller diameter than the diameter of the other part 17 of the section 14 on the side facing away from the bristles so that it can take a cap fitting over the bristles as far as the ring, the outline of which will
15 be a continuation of the part 17.

Illustrated in figure 3 is a second preferred embodiment very similar to the previous embodiment. This embodiment is distinguished from the previous one
20 primarily by the tilt of the ring 16 which is the opposite of what it is in the first embodiment, such that the upper part of the ring - that projecting the furthest from the handle - extends on this occasion toward the head. The other features of the brush are
25 essentially unchanged. Operation of the brush is the same, and remains characterized by a single stable position.

Figure 4 illustrates a third embodiment. On this
30 occasion, the tilt of the ring 16 is close to that of the first embodiment although less pronounced. The head 6 is largely unchanged compared with the first embodiment. However, the cross section of the handle decreases, beginning at the base of the head 6, and is
35 at a minimum roughly at a point 36 situated mid-way between the head 6 and the ring 16. Beginning at this section, and moving toward the rear end 20, the handle has an elongate and very slightly curved shape (its center of curvature being situated on the far side from

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the bristles), the cross section of the handle increasing toward the rear end 20. The lower flat 18 is always present although its width is less than in the first embodiment. Also, on the upper side of the end 20
5 is a bevel 38 of elliptical shape in plan view and with a slight convex curvature in longitudinal profile.

There is no change to the operation of the brush. In the stable position, the ring 16 has a single point of
10 contact with the support and the flat 18 here forms a surface-to-surface contact with the support with a number of points of contact greater than or equal to three. As a result, the oscillations of the brush about the position of equilibrium are reduced or absent.
15 Beginning in any position, the rolling of the brush takes place partly on the ring 16 and partly on the lower flat 18 and the upper half of the elliptical edge of the bevel 38 situated at the opposite end of the handle from the bristles.

20 Figure 5 illustrates a fourth embodiment of the invention. On this occasion, the ring 16, which is off-center again, extends in a general plane at right angles to the longitudinal direction of the brush. The
25 part of the brush extending from the head 6 inclusive, to the ring 16, is practically identical to that in figure 1. The part of the handle extending from the ring 16 to the rear end 20 is more or less symmetrical to the above part about a point of symmetry S situated
30 on the longitudinal axis of the brush, in the interior of the brush level with the ring 16. In this way, the handle part has a circular lower face 40 and a flat upper face 42 that is curved as it approaches the ring 16. Once again, the brush has a single position of
35 stable equilibrium. On this occasion, in the stable position, the brush rests on the support via a point 34 of the ring and a point 32 of the curved lower face 40, close to the rear end 20.

It is, of course, possible to make numerous modifications to the invention without departing from its scope.

5 For example, the brush may be designed so that it has at least two positions of stable equilibrium, in each of which the brush extends parallel to the support with the bristles pointing toward the support, possibly being inclined with respect to the support, and at a
10 distance from it.

It will be appreciated that the options as to the volume and mass distribution of the brush according to the invention are numberless. In particular, the
15 differences of shapes between two brushes in accordance with the invention can be very pronounced or on the contrary minor, not to say imperceptible.

As has been seen, the ring 16 is a very simple way of
20 producing the function of the brush according to the invention. Nonetheless, this function is not dependent solely on the configuration of the ring and on its position on the brush, but also depends very much on the configuration of the brush as a whole.
25 Consequently, it is possible to position the ring centrally on the handle, provided that the configuration of the rest of the handle produces the abovementioned function. Another possibility is to dispense with the ring and choose a volume and mass
30 distribution of the brush which in themselves produce the abovementioned function. Material may be added on each side of the ring 16 to make the surface of the handle continuous with the perimeter of the ring and thus no longer distinguish the ring and so obliterate
35 the edges 24, 26.

It is also possible to provide, independently of the invention, a toothbrush of elongate form, comprising bristles, and so designed as to exhibit on a flat

horizontal support a single position of stable equilibrium in which position the longitudinal direction of the brush is essentially parallel to the support and the bristles lie at a distance from the support.

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CLAIMS

1. A toothbrush (2) of elongate form, comprising
bristles (9), and so designed as to exhibit, on a
flat horizontal support (30), at least one
position of stable equilibrium in which the
longitudinal direction of the brush is essentially
parallel to the support and the bristles (9) lie
at a distance from the support and extend toward
the support, characterized in that said
position(s) of stable equilibrium is or are the
only position(s) of stable equilibrium of the
brush on the support.
2. The brush as claimed in claim 1, characterized in
that there is only one said position of stable
equilibrium of the brush.
3. The brush as claimed in claim 1 or 2,
characterized in that the brush comprises:
- a distal portion (20);
 - a proximal portion (16) extending between the
bristles (9) and the distal portion (20) in the
longitudinal direction; and
 - an intermediate portion (17) between the distal
and proximal portions,
- the brush being so designed that, for any position
in which the brush is supported by a flat
horizontal support (30) with the longitudinal
direction essentially parallel to the support, the
distal (20) and proximal (16) portions constitute
the portions of contact of the brush with the flat
support (30) and the intermediate portion (17)
lies at a distance from the support.
4. The brush as claimed in claim 3, characterized in
that the brush is so designed that the proximal
portion (16) exhibits a single point of contact

(34) with the support (30) in the or each position of stable equilibrium.

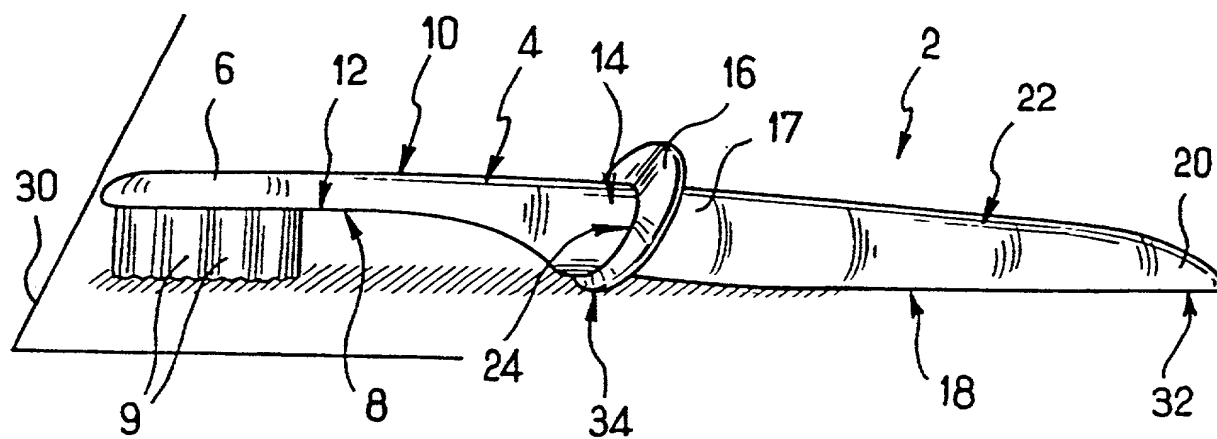
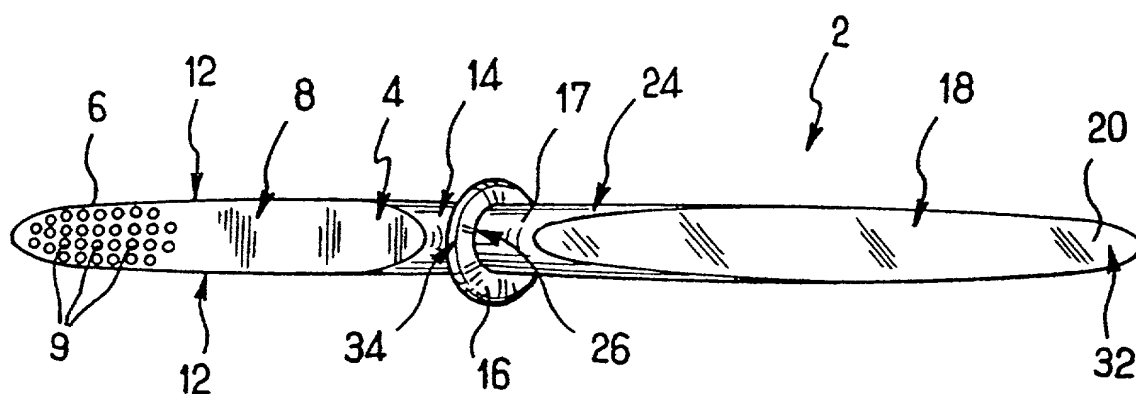
5. The brush as claimed in claim 3 or 4,
5 characterized in that the brush is so designed that, for any position in which the brush (2) is supported by a flat horizontal support (30) with the longitudinal direction essentially parallel to the support, the proximal portion (16) exhibits a
10 single point of contact with the support.
6. The brush as claimed in any one of claims 3-5, characterized in that the proximal portion (16) is of a generally flat shape.
15
7. The brush as claimed in any one of claims 3-6, characterized in that the proximal portion (16) is of a generally flat shape in a plane essentially perpendicular to the longitudinal direction of the
20 brush.
8. The brush as claimed in any one of claims 3-7, characterized in that the proximal portion (16) is of a generally flat shape in a plane that is essentially inclined with respect to the
25 longitudinal direction of the brush.
9. The brush as claimed in any one of claims 3-8, characterized in that the proximal portion (16) is off-center with respect to a central longitudinal
30 axis of the brush.
10. The brush as claimed in any one of claims 3-9, characterized in that, the brush comprising a
35 handle (4), the proximal portion (16) projects from a side of the handle opposite another side of the handle supporting the bristles (9).

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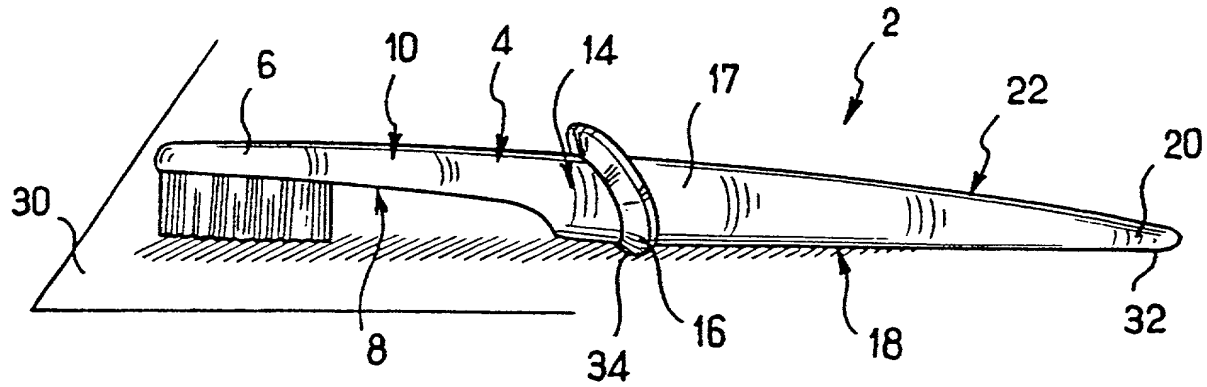
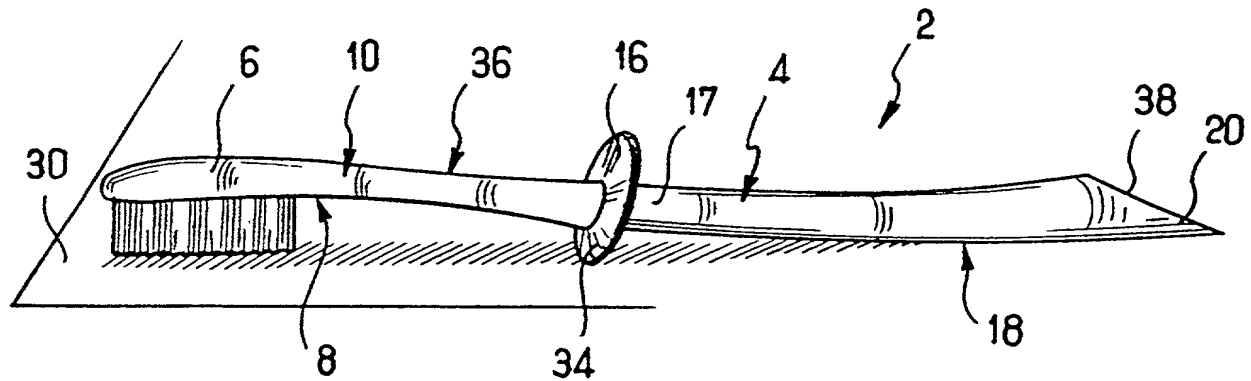
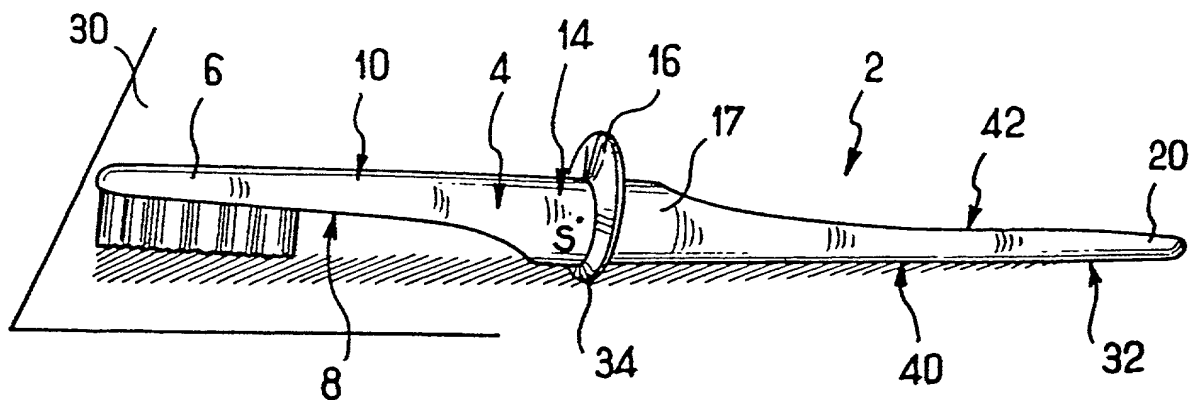
11. The brush as claimed in claim 10, characterized in that the proximal portion (16) projects from the handle (4) all the way around a longitudinal axis of the brush.
- 5
12. The brush as claimed in claim 10 or 11, characterized in that the proximal portion (16) forms with the handle (4) a re-entrant edge (24) on a side of the proximal portion situated toward the bristles (9).
- 10
13. The brush as claimed in any one of claims 10-12, characterized in that the proximal portion (16) forms with the handle (4) a re-entrant edge (26) on a side of the proximal portion situated toward the distal portion (20).
- 15
14. The brush as claimed in any one of claims 3-13, characterized in that the proximal portion (16) has an elastomeric outer face.
- 20
15. The brush as claimed in any one of claims 3-14, characterized in that the brush is so designed that the distal portion (20) exhibits two points of contact with the support in the or each position of stable equilibrium.
- 25
16. The brush as claimed in any one of claims 3-15, characterized in that the distal portion (20) has a flat (18) generally parallel to the longitudinal direction of the brush.
- 30
17. The brush as claimed in any one of claims 1-16, characterized in that the brush has the shape illustrated in one of figures 1-5.
- 35
18. A toothbrush (2) of elongate form and comprising bristles (9), characterized in that it is so designed that, when the brush is placed in any

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FIG. 1FIG. 2

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FIG. 3FIG. 4FIG. 5

Declaration and Power of Attorney For Patent Application

English Language Declaration

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

TOOTHBRUSH THAT SPONTANEOUSLY ADOPTS A POSITION OF STABLE EQUILIBRIUM ON A HORIZONTAL SUPPORT

the specification of which
(check one)

☐ is attached hereto.

☒ was filed on February 16, 2000 as ~~United States Application No.~~ PCT International
Application Number PCT/FR00/00384
and was amended on _____

(if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119(a)-(d) or Section 365(b) of any foreign application(s) for patent or inventor's certificate, or Section 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate or PCT International application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application(s)

Priority ~~Not~~ Claimed

| | | | |
|----------|-----------|------------------------|-------------------------------------|
| 99 01988 | FRANCE | 18 February 1999 | <input checked="" type="checkbox"/> |
| (Number) | (Country) | (Day/Month/Year Filed) | |
| | | | <input type="checkbox"/> |
| (Number) | (Country) | (Day/Month/Year Filed) | |
| | | | <input type="checkbox"/> |
| (Number) | (Country) | (Day/Month/Year Filed) | |

I hereby claim the benefit under 35 U.S.C. Section 119(e) of any United States provisional application(s) listed below:

(Application Serial No.)

(Filing Date)

(Application Serial No.)

(Filing Date)

(Application Serial No.)

(Filing Date)

I hereby claim the benefit under 35 U. S. C. Section 120 of any United States application(s), or Section 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. Section 112, I acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, C. F. R., Section 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application:

PCT/FR00/00384

16 February 2000

Pending

(Application Serial No.)

(Filing Date)

(Status)
(patented, pending, abandoned)

(Application Serial No.)

(Filing Date)

(Status)
(patented, pending, abandoned)

(Application Serial No.)

(Filing Date)

(Status)
(patented, pending, abandoned)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. *(list name and registration number)*

G. Patrick Sage #37,710

Send Correspondence to:

G. Patrick Sage

THE FIRM OF HUESCHEN AND SAGE

500 Columbia Plaza, 350 East Michigan Ave. KALAMAZOO 49007 3856

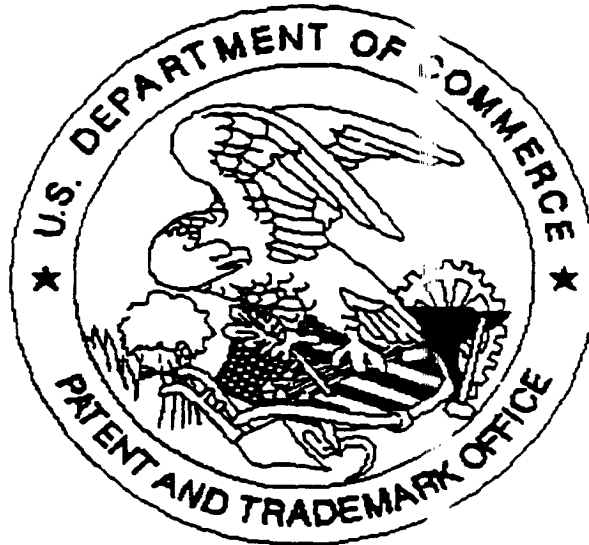
Direct Telephone Calls to: *(name and telephone number)*

616-382-0030

| | | |
|-------------------------------------|--|--------------------------|
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| Sole or first inventor's signature | ARNAUD DOAT <i>[Signature]</i> | Date 7/07/2001 |
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|--------------------------------------|
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| Second inventor's signature |
| Date |
| Residence |
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